

In re Patent Application of:

DAIR ET AL.

Serial No. 09/833,107

Filed: April 10, 2001

IN THE CLAIMS

1. (currently amended) A fiber optic module for coupling photons between optoelectronic devices and optical fibers, the fiber optic module comprising:

a base;

a first horizontal printed circuit board (PCB) arranged horizontally with the base and parallel to a first optical axis of a first optoelectronic device, the first optoelectronic device having terminals coupled to the first horizontal printed circuit board; and

a second vertical printed circuit board (PCB) coupled to the first horizontal PCB arranged at a perpendicular angle with the base and parallel to a second optical axis of a second optoelectronic device, the second optoelectronic device having terminals coupled to the second vertical printed circuit board.

2. (original) The fiber optic module of claim 1 further comprising: a housing coupled to the base.

3. (original) The fiber optic module of claim 2 wherein, the housing is a shielded housing to encase the first and second printed circuit boards to reduce electromagnetic interference (EMI).

4. (original) The fiber optic module of claim 3 wherein, the housing has an inner septum to separate the fiber optic module into a first side and a second side and the inner septum is a conductive shield to reduce crosstalk electromagnetic radiation.

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5. (original) The fiber optic module of claim 1 wherein, the base has a first and second opening; the first horizontal printed circuit board has a plurality of pins extending through the first opening in the base to couple to a host printed circuit board; and the second vertical printed circuit board has a plurality of pins extending through the second opening in the base to couple to the host printed circuit board.

6. (original) The fiber optic module of claim 5 wherein, the first and second opening in the base are a plurality of pin holes in the base.

7. (withdrawn) The fiber optic module of claim 5 wherein, the first and second opening in the base are a first and second cutout in the base.

8. (withdrawn & currently amended) The fiber optic module of claim 5 wherein, the first horizontal and second vertical printed circuit boards further comprises: electrical components coupled between the first optoelectronic device and the plurality of pins of the first printed circuit board and between the second optoelectronic device and the plurality of pins of the second printed circuit board, the electrical components for controlling the first and second optoelectronic devices.

9. (withdrawn) The fiber optic module of claim 1 wherein, the first horizontal printed circuit board further comprises: a ground plane to reduce electro-magnetic fields generated by the electrical components.

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10. (withdrawn) The fiber optic module of claim 1 wherein, the second vertical printed circuit board further comprises: a ground plane to reduce electro-magnetic fields generated by the electrical components.

11. (withdrawn) The fiber optic module of claim 1 further comprising:

a first optical block coupled to the first optoelectronic device, the first optical block having a first opening to receive the first optoelectronic device, and
a first lens to couple photons between the first optoelectronic device and an optical fiber.

12. (withdrawn) The fiber optic module of claim 11 further comprising: a nose coupled to the base, the nose to receive an optical fiber connector and to hold an optical fiber substantially fixed and aligned with an optical opening of the optical block.

13. (withdrawn) The fiber optic module of claim 12 further comprising: a nose shield surrounding the nose to reduce electromagnetic interference.

14. (withdrawn) The fiber optic module of claim 1 further comprising:
a second optical block coupled to the second optoelectronic device, the second optical block having
a second opening to receive the second optoelectronic device, and
a second lens to couple photons between the second optoelectronic device and an optical fiber.

15. (withdrawn) The fiber optic module of claim 11 further comprising:
a second optical block coupled to the second optoelectronic device, the second optical block having
a second opening to receive the second optoelectronic device,
and
a second lens to couple photons between the second optoelectronic device and an optical fiber.

16. (withdrawn) The fiber optic module of claim 1 further comprising:
an optical block coupled to the first and second optoelectronic devices, the optical block having
first and second openings to receive the first and second optoelectronic devices,
a first lens to couple photons between the first optoelectronic device and a first optical fiber, and
a second lens to couple photons between the second optoelectronic device and a second optical fiber.

17. (withdrawn) The fiber optic module of claim 16, wherein,
the first lens of the optical block to launch photons into the first optical fiber from the first optoelectronic device.

18. (withdrawn) The fiber optic module of claim 16, wherein,
the second lens of the optical block is a focusing lens to receive photons from the second optical fiber and to couple them to the second optoelectronic device.

19. (withdrawn) The fiber optic module of claim 16 further comprising: a nose coupled to the base, the nose to receive an

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optical fiber connector and to hold an optical fiber substantially fixed and aligned with an optical opening of the optical block.

20. (withdrawn) The fiber optic module of claim 19 further comprising: a nose shield surrounding the nose to reduce electromagnetic interference.

21. (withdrawn) The fiber optic module of claim 13, wherein, the first optoelectronic device is a photodetector.

22. (withdrawn) The fiber optic module of claim 13, wherein, the second optoelectronic device is an emitter.

23. (withdrawn) The fiber optic module of claim 22, wherein, the emitter is a vertical cavity surface emitting laser (VCSEL).

Cancel Claims 24 to 92

93. (original) A fiber optic module for coupling photons between optoelectronic devices and optical fibers, the fiber optic module comprising:
a horizontal printed circuit board (PCB) arranged horizontally having a first plurality of pins and a second plurality of pins to couple to a host printed circuit board and a first optoelectronic device having terminals coupled to the horizontal printed circuit board.
a vertical printed circuit board (PCB) coupled to the horizontal printed circuit board arranged at a perpendicular angle and parallel to a second optical axis of a second

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optoelectronic device, the second optoelectronic device having terminals coupled to the vertical printed circuit board; and a housing coupled to the horizontal printed circuit board.

94. (original) The fiber optic module of claim 93 wherein, the housing is a shielded housing to encase the horizontal and the vertical printed circuit boards to reduce electromagnetic interference (EMI).

95. (original) The fiber optic module of claim 93 wherein, the horizontal printed circuit board is arranged parallel to a first optical axis of the first optoelectronic device.

96. (original) A fiber optic module for coupling photons between optoelectronic devices and optical fibers, the fiber optic module comprising:
a base having a first opening and a second opening;
a horizontal printed circuit board (PCB) arranged horizontally having a first plurality of pins protruding through the first opening and a second plurality of pins protruding through the second opening to couple to a host printed circuit board and a first optoelectronic device having terminals coupled to the horizontal printed circuit board.
a vertical printed circuit board (PCB) coupled to the horizontal printed circuit board arranged at a perpendicular angle and parallel to a second optical axis of a second optoelectronic device, the second optoelectronic device having terminals coupled to the vertical printed circuit board; and
a housing coupled to the base.

97. (original) The fiber optic module of claim 96 wherein,

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the housing is a shielded housing to encase the horizontal and the vertical printed circuit boards to reduce electromagnetic interference (EMI).

98. (original) The fiber optic module of claim 96 wherein, the horizontal printed circuit board is arranged parallel to a first optical axis of the first optoelectronic device.